

OmniBusBox II

Databus to Network Interfaces

Available Interfaces

MIL-STD-1553	Audio In/Out
ARINC 429/575	PMC/XMC Site
ARINC 708/453	Mini-PCle Site
ARINC 717/573	
RS-232/422/485	
Discrete I/O	
Dual Tri-Mode Ethernet	
USB 3.0 Device	

2-Core
Version



*Cost-Effective
Easy Operation*

4-Core
Version



*Powerful expansion
capabilities:
PMC/XMC site
Mini-PCle site
mSATA site*

Avionics Databus to Network Interfaces

The OmniBusBox II (OBB2) enables computers and networks to interface with multiple avionics databuses for testing, validating and simulating commercial and military avionics equipment and systems. These versatile units can be controlled through Ethernet or USB, or can be programmed to operate standalone. Readily available as Commercial Off-The-Shelf (COTS) products, the OBB2 is perfect for challenging simulation, test, interface, bridging, control, simulation and data recording applications.

The OmniBusBox II is the next-generation of Ballard's popular OmniBusBox product with faster I/O and processing capabilities. The OBB2 is highly configurable and includes built-in standard peripherals (Ethernet, serial, USB and high quality audio lines), along with four internal Cores that can be populated with a variety of databus protocols and discrete I/O modules. With the newest advanced set of MIL-STD-1553 and ARINC 429 modules, users can verify wave form compatibilities, test functions of bus shorts and opens, and—when combined with our CoPilot® software—perform lab, production and flight test verification and simulation right out of the box.

Architecture

At the heart of the OmniBusBox II is a P1022 Freescale PowerPC processor and Ballard's FPGA protocol engines. In addition to the built-in standard peripherals and core I/O functions, PMC/XMC and Mini-PCle sites in the 4-core version provide customer expansion capabilities such as ARINC 664, CAN, IEEE 1394 and wireless protocols. The OBB2 includes extensive timing synchronization with multiple sources including 10MHz, PPS, IEEE 1588 and IRIG A/B. The 1U high case is easily placed on a desk or rack mountable. Though designed primarily as a lab product, the OBB2 has potential for use in large fixed-wing aircraft and light vehicle applications.

Software

The OBB2 can operate tethered, where a separate computer runs the application and controls the device over Ethernet or USB, or it can operate as a system, where an embedded application boots on power-up and runs without host intervention. The included Software Development Kit (SDK) provides tools and examples to facilitate the development of software applications. The OBB2 uses Ballard's universal BTIDriver API, so application software for this device is easily ported to or from other Ballard products.

Features

- Dual Core PPC Embedded Processor
- Ethernet, serial and USB
- Supports multiple protocols in one device
- Up to 8 MIL-STD-1553 databuses
- Up to 64 ARINC 429 databuses
- Up to 32 ARINC 717 databuses
- Up to 16 ARINC 708 databuses
- Up to 16 RS-232/422/485 serial ports
- Up to 128 avionics discrete I/O
- PMC/XMC expansion site
- Mini-PCle expansion site
- Return to factory settings feature
- Accepts both lab and aircraft power (AC)

Extensive Timing Features

- 10 MHz/PPS clock synchronization
- IRIG A or B, AM, PWM and PPS
- IRIG and clock sync generators
- IEEE 1588 Hardware Assist
- 64-bit hardware timetag (1ns resolution)
- NTP Server/client
- Hardware Discrete Sync and Trigger

Software

- Universal BTIDriver™ API compatible
- Embedded Linux® SDK (included)
- Contact factory for RTOS BSPs (optional)
- CoPilot® analysis & test software (optional)

Applications

- Simulation of databus and I/O system traffic
- Data and protocol conversion
- Databus and network bridging
- Data servers; Data recorders
- Communications
- Controllers
- Radio controls including VoIP

OmniBusBox II

Databus to Network Interfaces

Standard Interfaces

Ethernet

Auto-sensing 10/100/1000 Mb/s
IEEE 1588 (PTP) hardware assist
TCP/IP, UDP
Built-in SSH, FTP, and Web servers

USB

USB 3.0 Device
Standard USB driver interface
USB 2.0 Host

RS-232/422/485

Selectable mode and baud rates
Ethernet (TCP) serial server mode

Example I/O Modules

MIL-STD-1553 - Standard Module

Up to 2 dual-redundant channels
BC/RT/MON (Single- or Multi-Function)
Hardware controlled transmit scheduling
Sequential monitor and Time Stamping
CH/TA/SA filtering
Error injection including MBZC shifting
Playback with errors
Amplitude control
16 Open/GND avionics discrete I/O

ARINC 429 - Standard Module

Up to 16 Tx/Rx configurable channels
Periodic and asynchronous messages
Hardware controlled transmit scheduling
Hardware playback mode
Receive message filtering (Label/SDI)
Sequential monitor and Time Stamping
Programmable bit rate frequency
Error detection and injection
Parity bit inversion
+/- bit count (8-33 bits)
Intermessage gap error

ARINC 429 - Advanced Module

Up to 8R/8T channels
Same features as Standard Module plus
Control of each bus leg as open, ground or
normal operation

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Transmit amplitude control (0 to 200%)
Transmit NULL control (-5V to 5V)

ARINC 708

Up to 2R/2T channels
Hardware controlled transmit scheduling
Receive message filtering
Software selectable bus termination
Sequential monitor and Time Stamping

ARINC 717

Up to 4R/4T channels
Biphase/Bipolar signaling
Sub-frame and super-frame support
64, 128, 256, 512, 1024, 2048, 4096, 8192 wps
Sequential monitor and Time Stamping

RS-232/422/485

4 ports
Programmable transmit gaps
Receive data time stamping
Error detection and injection

Avionics Discrete I/O

32 programmable Input/Output
Sequential monitor and Time Stamping
Hardware controlled output scheduling

Specifications

Base Model Features

OmniBusBox II is available in a multitude of configurations that all share these features:

- P1022 Freescale dual core PPC (800MHz)
- 1 GB DDR3 SDRAM
- 2 Ethernet ports (10/100/1000)
- 2 RS-232/422/485 (selectable)
- 1 USB 3.0 device port
- 2 pseudo-balanced In/Out audio lines
- Voltage and temperature monitoring
- RoHS

Advanced Timing

64-bit hardware time-tag (1ns resolution)
IRIG A/B input and output (AM, PWM)
Generate or synchronize timer
Synchronize hardware time-tags
10 MHz and PPS
Frame synchronization
Synchronize hardware time-tags



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Environmental

Storage Temperature: -40 to 85°C
Operating Temperature: -20 to 55°C
Convection cooled, internal fans
Humidity: 0 to 95% (non-condensing)

Mechanical

Size: 1.8 (1U) x 12.0 x 10.5 in
(45 x 305 x 267 mm)
Weight (typical): 3.5 lb (1.6 kg)
Ruggedized construction
Mounting options: Table top (rubber feet),
bolt down, rack mount (parts included)

Electrical

Input power: 110-240VAC, 47-400Hz
Replaceable fuses

Connectors

Databus I/O: 60-pin Molex® LFH™ (per core)
Base System: DB-9, RJ-45, USB 3.0 Device
Various interface cables available

Software

Embedded Linux OS and SDK (included)
Universal BTIDriver™ API compatible
Contact factory for RTOS BSPs (optional)
CoPilot analysis & test software (optional)

Versions/Expansion Options

Two OmniBusBox II versions are available:

I/O Modules	Description
2 cores	Easy-to-use network appliance
4 cores	Full-featured with expansion sites for: PMC/XMC, Mini-PCIe, and mSATA memory storage

PMC/XMC site provides customer expansion capabilities such as additional MIL-STD-1553/ARINC 429/717/708 protocols, ARINC 664, Serial, Analog, CAN, Synchro, 10G Ethernet, IEEE 1394

Mini-PCIe site provides customer expansion capabilities such as GSM, IEEE-802.11, GPS

Ordering Information

Visit www.ballardtech.com/omnibus or contact factory for more details.



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